

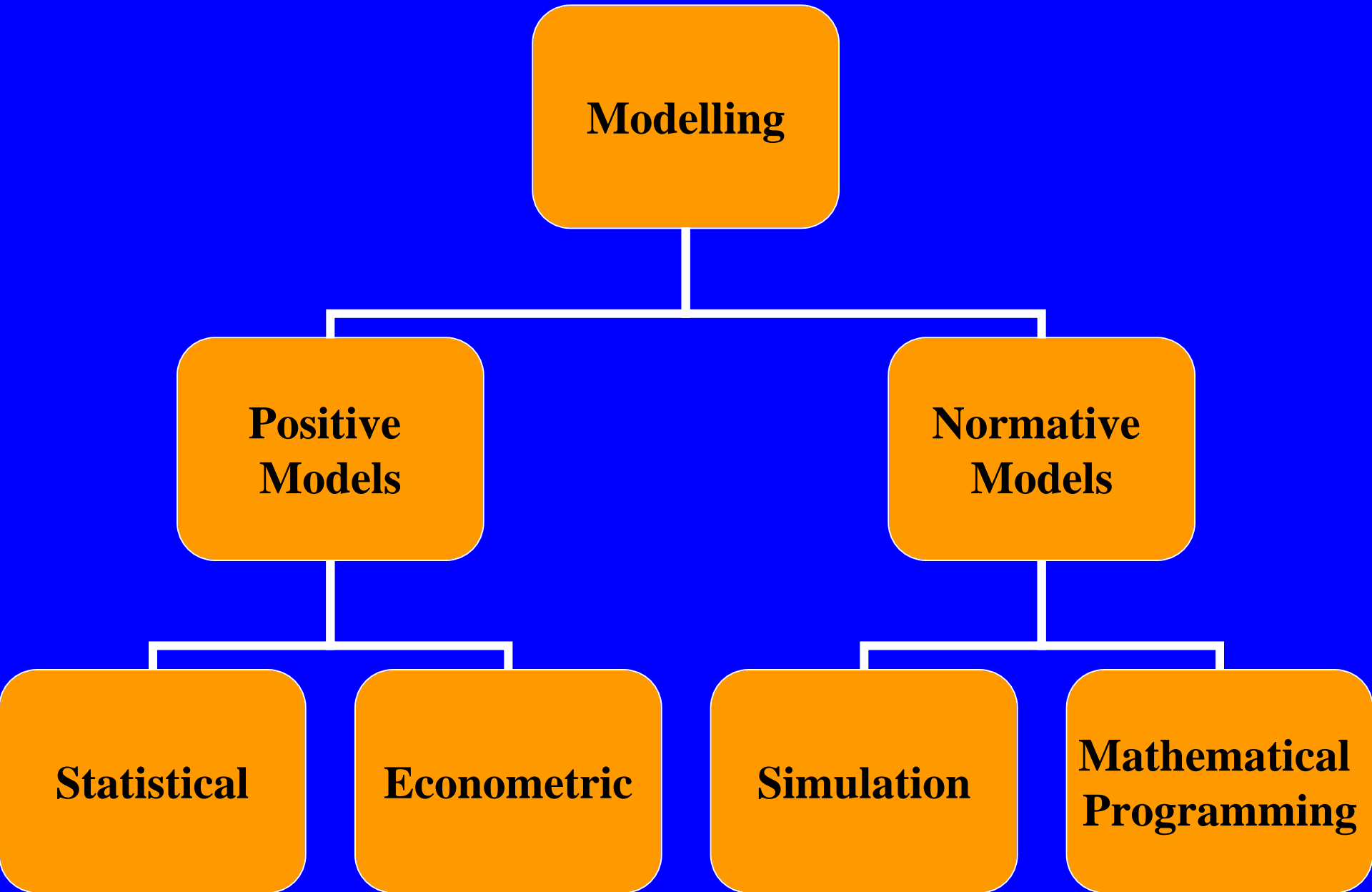
Development and use of the Moorepark Dairy Systems Model

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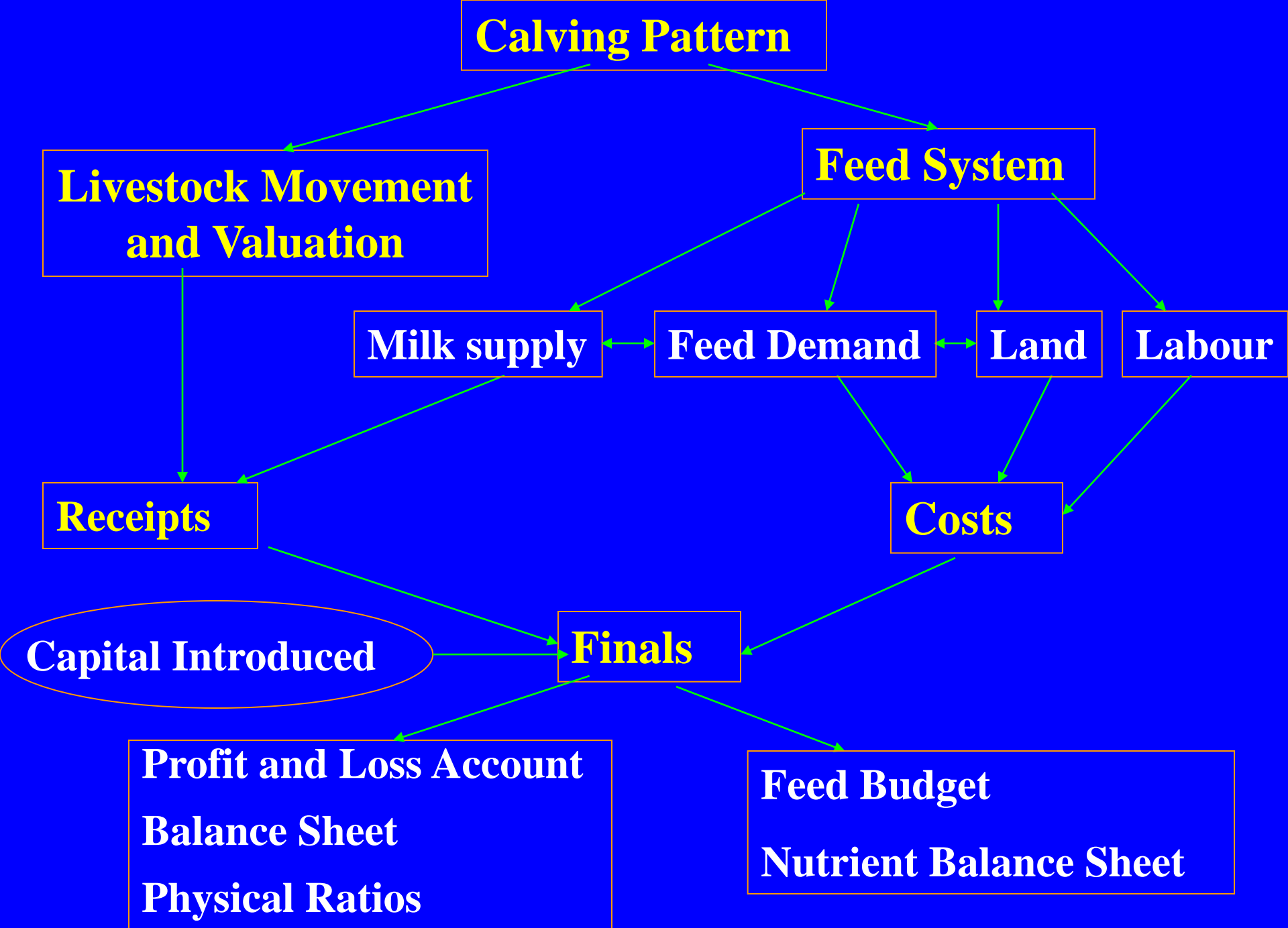
Overview

- MDSM
 - Brief description
 - Uses
- New sub model development
- Further model development



MDSM

- Stochastic budgetary simulation model of a dairy farm
- Objective – Develop a model capable of representing all aspects of the production system
 - Technical change
 - Institutional change
 - Economic change

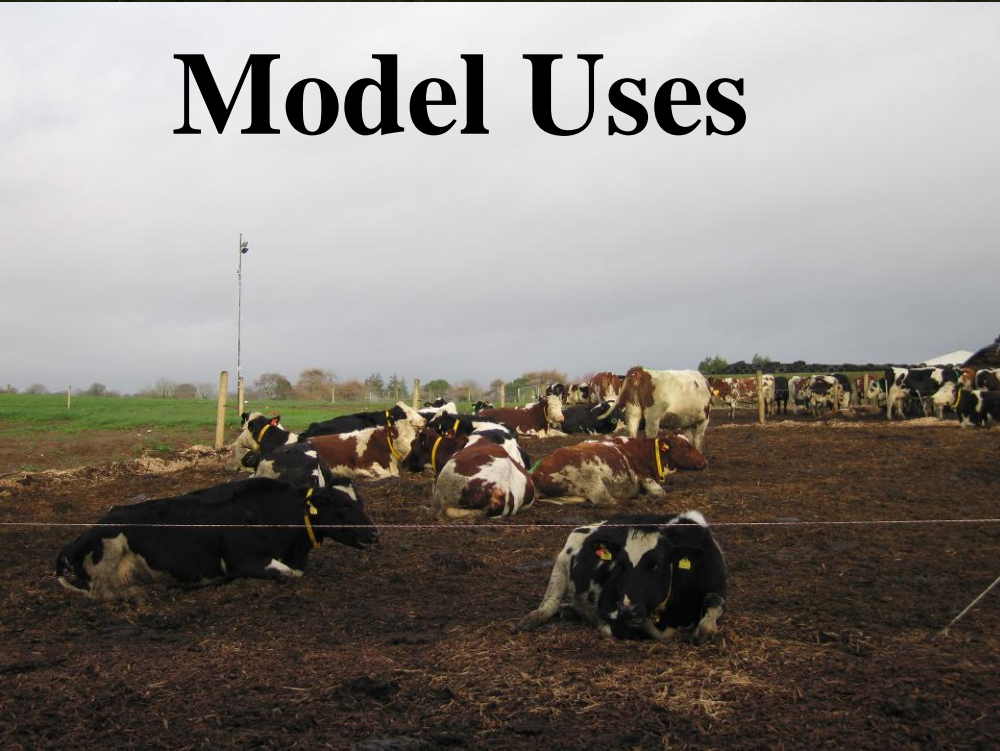


Risk

- Incorporated through stochastic budgeting
 - Key variables included
 - Probability distributions
 - Monte Carlo Simulation
 - @Risk computer package
 - Output distributions



Model Uses



Model applications

- System
- Genetic
- Regional and climatic effects
- Policy analysis
- Investment appraisal
- Environmental
- Decision support

Sample - application

- Infertility significant cost on dairy farms
 - Calving date
 - Culling costs
 - Labour costs
 - Age profile of herd
- Research question –
 - “Is it more economic to cull a dairy cow at end of lactation or extend lactation if she fails to become pregnant?”

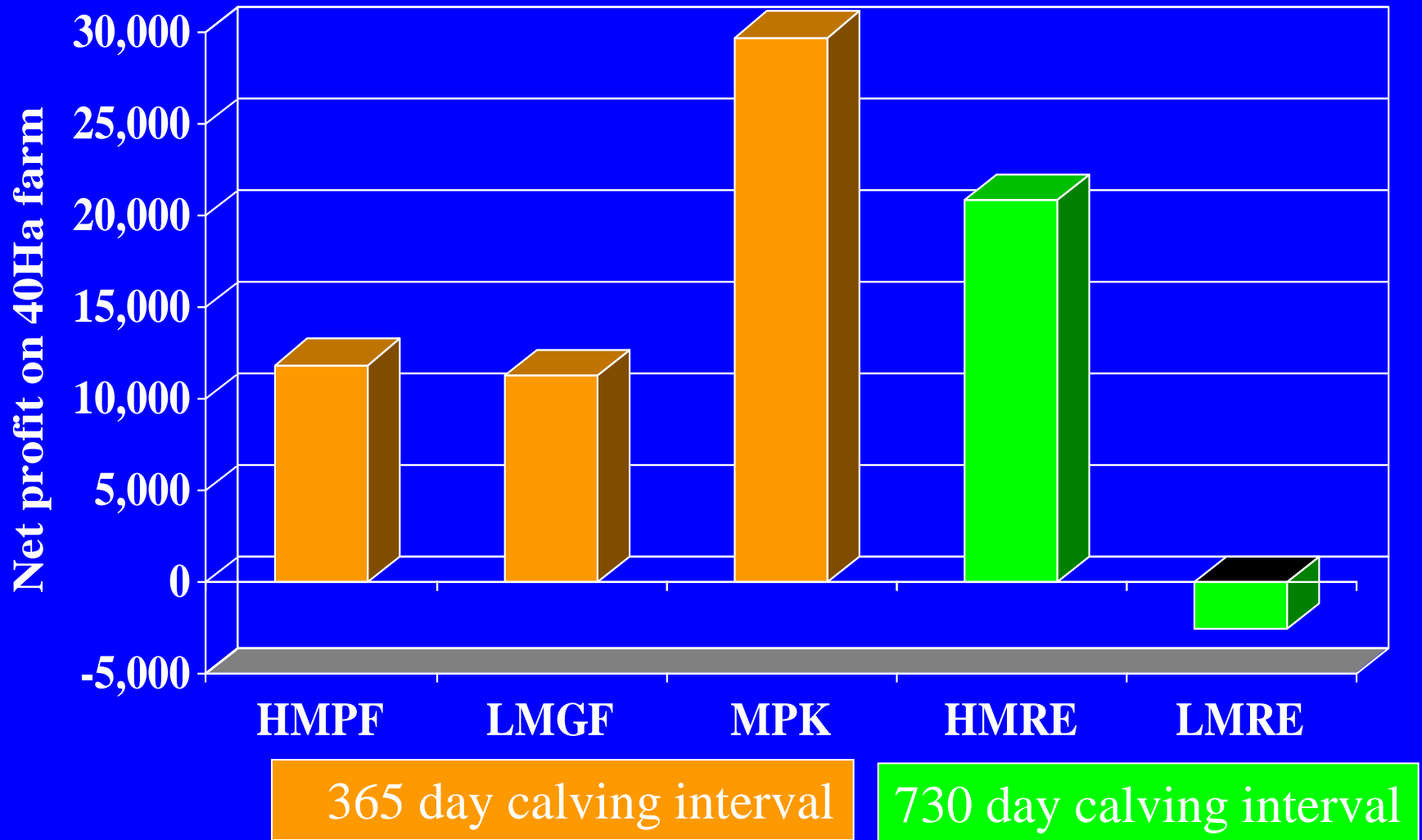
Considerations

- Increased feed costs
 - Reduced grazed grass in diet
- Increased labour costs
- Increased milk output initially but reduced lifetime performance
- Increased milk solids concentration
- Calf value
- Cull value
- Reduced subsequent fertility performance

Assumptions

- Milk price taken @ 22c/l with a 40Ha farm
- Full costs included
- 5 Comparisons carried out;
 - 365 day calving interval
 - High milk yield and poor fertility (HMPF)
 - Low milk yield and good fertility (LMGF)
 - Standard MPK system (MPK)
 - A proportion of herd with 730day calving interval
 - High milk yield with 30% of cows in herd recycled (HMRE)
 - Low milk yield with 10% of cows in herd recycled (LMRE)

Net Profit



New sub-model development

- New sub models to answer new questions
 - Grass growth model – Cristina Hurtado - Uria
 - Animal health model – Eugene Doherty
 - GHG emissions model - LCA – Donal O’ Brien
 - Milk processing sector model – Una Geary

Grass growth model

Animal health model

- Sub optimal animal health
 - Reduced animal performance
 - Reduced potential for expansion
 - Increased costs
- Model will capture
 - Biological impacts of disease
 - Quantify lost revenue
 - Quantify costs to control the disease

GHG emissions model

- Develop model of GHG for Irish production systems
- Establish economic and GHG effect of mitigation strategies inside farm gate
- Complete LCA for Irish dairy products

Milk processing sector model

- Stimulus project
- Linkage between Moorepark, RERC, UCD, CIT, UCC and Massey University NZ
- Develop model of processing sector
 - Product portfolio
 - Processing costs
 - Carbon
 - Transport
- Optimise the overall Industry

Further model development

- Dynamic nature of the simulations
- Guide research experimentation
- Grass intake model - Brendan O Neill

Grass intake model

- Walsh Fellowship linked with UCD and INRA France
- Determine the factors affecting Dry matter intake at pasture
- Use model to predict intake
 - Sward quality
 - Pre and post grazing herbage yields
 - Grass type
- Link with lactation model

Model development goal

- *“Develop dynamic, interactive models capable of modelling the whole production system as accurately as possible in order to answer key industry questions as and when they arise.”*

Dairy Industry 2020

